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ABSTRACT

Asserting that few teachers can provide examples of how they actually used educational research to shape an instructional decision, this position paper argues that as presently structured, the educational research institution does not appear to be effective in communicating products of its work to practitioners. The paper examines obvious barriers to communication between researchers and practitioners including the tendency of researchers to focus on abstractions (hypotheses, theoretical implications, statistical analyses, etc.) versus practitioners' needs for clear descriptions of instructional methods and curriculum materials, including how well they worked and with what types of student. The formation of a Professional Resources Information Network Computerized for Educators (PRINCE) is proposed to provide teachers with practical information and materials directly tailored to meet specific instructional needs. PRINCE would parallel ERIC (the Educational Resources Information Center), the existing information network available to researchers. Following a general discussion of the problem, this document includes the following sections: (1) The Research/Practice Dilemma in ERIC; (2) The Current ERIC System; (3) Barriers to Practitioner Use; (4) Attempts to Make the System More Accessible to Practitioners; (5) Can an Information System Help Improve Schools? and (6) PRINCE: Professional Resources Information Network Computerized for Educators. Eighteen references are listed. (THC)

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Redesigning ERIC: A Modern Information System for Practicing Educators

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How does a document retrieval system
hope to change the way kids learn? (Lee G. Burchinal, 1973)

A multimillion dollar industry has been constructed on the assumption that research is vital to the improvement of educational practice. In universities and research centers throughout the United States thousands of academics and analysts pour forth a torrent of research findings which are recorded in reports, presented at conferences, published in scholarly journals, and indexed and stored in libraries and information systems.

In recent years, however, questions have been raised regarding the utility of this research in improving schools. When asked, few teachers (including those at research universities), can provide examples of how they actually used research to shape an instructional decision (Eisner, 1984). Many teachers believe research has little to do with instruction and few read research literature. As presently structured, the educational research institution does not appear to be effective in communicating products of its' work to practitioners.

There are obvious barriers to communication between researchers and practitioners. Baker (1983) contends academics often are socialized against emphasizing practical implications of their work —— a scholars job is to study experiences rather than to create them. Researchers when they present their findings tend to focus on abstractions: hypotheses, theoretical implications, statistical analyses etc.. On the other hand practitioners look for concrete information; a clear description of instructional methods and curriculum materials (where they can be obtained and how much they cost), how well they worked, and with what type of students.

The different attitudes of practitioners and researchers are clearly demonstrated by the language they use. There are obvious differences in the way researchers and practitioners describe what goes on in schools. Researchers talk about "engaged instructional time"; teachers talk about children working productively. Researchers describe "peer tutoring"; teachers describe children helping each other.

If educational research is to inform and stimulate school improvement it will require services of an interpreter; a mechanism to translate, synthesize, and package research findings so that they become more understandable and useful to practitioners.

The problems inherent in communicating research findings to practitioners are clearly demonstrated in the history of the Educational Resources Information Center (ERIC). However, the ERIC system may possibly offer a solution. With the aid of new technologies, information about effective teaching practices and innovative curriculum materials can be delivered directly to teachers' schools. This paper recommends development of a national Professional Resources Information Network Computerized for Educators (PRINCE) to provide teachers with practical information and materials directly tailored to meet specific instructional needs.

The research/practice dilemma in ERIC

The question of whether the ERIC system can, or even should, play a role in improving educational practice in the public schools has been the focus of recurring debate since the current system was developed in the late 1960's. This debate can be traced to Nixon era policy makers

who having concluded that Johnson administration Great Society programs were ineffective, decided that more knowledge, not more dollars, was the key to improving schools (Crandell, 1982). The decision to place greater emphasis on educational research led eventually to creation of the National Institute of Education (NIE) of which the Educational Research Information Center (ERIC) became an information analysis arm.

The 1950s and 60s witnessed an information explosion, and a considerable delay evolved between the conduct of research and its publication in any accessible source. In addition, there was was a proliferation of unpublished or "fugitive" literature--- reports of federally funded research, government documents, conference proceedings, unpublished manuscripts, etc.--- which if not catalogued and referenced would escape circulation. The problem therefore was viewed as one of information storage and retrieval -- organizing a vast array of published and unpublished literature and disseminating it to the educational community (Crandell, 1982). The result was the development of ERIC, a national system designed to provide educators with information regarding reports of current findings in educational research, conference proceedings, significant speeches, bibliographies, and descriptions of innovative programs and practices.

Policy makers had hoped that providing research information to educators through ERIC would result in public school improvement. From the early days, however, there was a substantial sense of disappointment that research findings disseminated through ERIC were not having greater influence on educational practice. In 1969 Daniel P. Moynihan and Chester Finn brought to the White House the view that research in

education had proved "inadequate", probably incompetent, and certainly disappointing in its ability to improve the public schools (Dershimer, 1976). It had quickly become apparent that it is insufficient simply to make research reports accessible; passive information exchange can seldom significantly improve practice. The decision was made to invest more money in activities which focussed directly on improving practice. A Division of Practice Improvement was developed separate from the Division of Information Resources, of which ERIC was a part (Dissemination Advisory Committee, 1970). This decision resulted in reduced funding for the ERIC system. The last decade, 1975-85, has seen little modification in the ERIC system, changes in its operation have been largely technical.

There has, however, been a continuing concern that ERIC's resources be used more directly in the service of practice improvement. The Dissemination Advisory Committee (1970) and the Rand Report (Greenwood and Weiler, 1971) both recommended that ERIC be redesigned and expanded to become more accessible to practitioners. In 1978, Bibliographic Retrieval Services was given a contract to test an ERIC-like practice file (Crandell, 1982). As a result of the Practice File study there are now 46,000 documents (out of an ERIC total of 245,000) tagged for practitioners. None of these efforts, however, has resulted in major modifications to the ERIC system. There still remain substantial barriers to practitioner use and practicing educators continue to be the smallest group of clients. ERIC is a operated by academics for academics and ERIC's role in practice improvement remains unresolved.

This paper discusses ERIC's relationship with practitioners and offers ideas on how this relationship might be made more productive.

The current ERIC system

In 1966 ERIC was established by the U.S. Office of Education (OE) to create an educational research documentation network linking universities, professional organizations, and other documentation efforts of the education community. The system's primary responsibilities are to locate, acquire, and evaluate source materials; to index, abstract, and store these materials; retrieve information on request; disseminate information in the form of references, annotated bibliographies, abstracts or reports; prepare alerting publications and trend studies; and render technical and consulting services (Trester, 1981).

Today ERIC is a vast educational reference reservoir with a collection of over 245,000 documents from a variety of public and private sources; with approximately 1000 documents being added each month (MacColl et al., 1985). A co-ordinating Federal Government Office (Central ERIC) located at the National Institute of Education, establishes policy and awards and monitors contracts to operate the network. Sixteen subject-oriented Clearinghouses, located in universities and professional associations, acquire, select, distill, and index documents for the database, produce information analysis and other user products, and assist users in retrieving information. Clearinghouses also prepare information analysis "products" such as

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bibliographies, descriptive reviews of the literature, and state of the art papers.

There are over 3,000 locations in universities and state and local education authority libraries, offices of professional associations etc. where clients can gain access to ERIC materials (MacColl, 1985). All materials processed by ERIC can be identified by manual searches of printed indexes or by computer searches of ERIC tapes. Two periodicals Resources in Education (RIE) and Current Index to Journals in Education (CJIE) provide users with updates on current literature. RIE is a monthly journal containing abstracts from the non-journal literature such as recently completed research reports, descriptions of outstanding programs, and other documents of educational significance. CJIE is a monthly guide to periodical literature with a coverage of more than 750 major education and education related periodicals.

The ERIC system is heavily tapped by academics and researchers, with an estimated 2.7 million usages each year (ERIC Fact Sheet). The ERIC system represents a relatively small federal government investment. The NIE's ERIC program support is only 4.1% ($5.6 million) of the estimated total of all ERIC costs. ERIC access points alone spend more than three times as much money to provide the public with ERIC information as the Federal Government spends to develop ERIC resources. ERIC users assume, through their fees, nearly 75% of the total of all costs associated with development, distribution, and use of ERIC information (ERIC Cost and Usage Study).

Barriers to practitioner use

ERIC is best known and most heavily used by clients whose jobs rely on information analysis. The King study reports that 75% of college, university, and state education authority staff are ERIC users, compared to 45% of local education authority staff and 20% of practitioners. The largest single group of users are higher education students who represent 34% of all usage (MacColl et al., 1985). For all types of clients, including practitioners, the most common purpose for using ERIC is researching a class paper. Although improvement of practice has been viewed from the beginning as a key ERIC goal, practitioners remain the smallest client group. Indeed ERIC appears to be used only rarely for directly improving practice.

Academic clients, by the nature of their work and the institutions of which they are part, are oriented toward information acquisition and synthesis. Knowledge seeking and knowledge use are major components of their roles. The ERIC system appears to be designed primarily with the needs of such knowledge seekers and researchers in mind. Even when practitioners or lay persons are considered as potential users, they are expected to behave as researchers. The system assumes that users have: the motivation to acquire and employ research results; skills to retrieve and analyze research reports; ability to synthesize diverse and sometimes conflicting research results; skill to translate research into action; and last but not least that the user has the time to do these things (Crandell, 1982).

Most practitioners, however, are not systematically prepared to frame research questions, or to pour through large volumes of printed

material that may result from a vague or incompletely structured search. Trester (1981) identified a number of ways that practicing educators differ from academics in their information seeking strategies. Most importantly they are less concerned with the process of formulating and reformulating questions, and more concerned with finding an answer to a specific instructional and classroom management situations. They do not want, or have the time, to plow through reams of original documents. They want an action plan or guide geared to a specific school situation.

Practicing educators are more inclined to welcome intermediaries in the information search process. They do not want research in its' original undigested form. They prefer to receive presorted lists of references, or packets of articles or documents in response to phone or mail requests, rather than to spend time seeking and compiling these themselves. They prefer a summary article that presents the best of current thinking on a topic. They want information on curriculum material that can be obtained quickly and conveniently.

University faculty, information specialists, and state level education administrators tend to be in environments supportive of ERIC use. Practitioners, by contrast, typically are not in a work environment that fosters information seeking and supports ready access to archival resources. Many work essentially alone, in a task structure that does not encourage research-based inquiry. They are not used to using (and do not have the time to use) library or search processes as part of their daily work and may have to go to considerable effort to secure access to such resources. Over half of the existing 3,000 ERIC access points are located at academic institutions and the remainder in

state and local education agency libraries and public libraries and offices of professional associations (MacColl, et al., 1982). ERIC use, except the on-line search mode, requires that the client go where the resources are, full use is a two-step process at least. The user has to go to a library, or other location that offers a search service or RIE and CIJE, in order to conduct the initial search. She or he must either stay there to find and read the fiche or hard copy, or wait for them to arrive. The location-bound nature of the current system renders it inconvenient for those who do not have ready access to a library or service center, and the two steps required to obtain the full text can be frustrating for the person who must deal with cumbersome ordering processes, cannot read microfiche, or needs information in a hurry.

Access via an on-line search, using a personal computer, solves the place-bound problem, but requires the searcher invest the time needed to become a skilled search strategist. An occasional user may not want to make this investment, and an unskilled prospective searcher is likely to be offered a too-large collection of too-varied material and thus find the experience discouraging. The NETWORK study indicates that optimal conditions for practitioner-use involve proximity, assistance in searching, and one-stop service as much as possible (Crandell, 1982).

Attempts to make the system more accessible to practitioners

The Dissemination Advisory Committee in 1970 recommended that there be more emphasis on practitioners including, new guidelines for information analysis. Their report states:

> While the spread of improved practice can be unquestionably be enhanced by distributing information about practice, the

modification of practice of course requires more than the transmission of information.

They recommended that ERIC materials be prepared with practitioners in mind --with less emphasis on whole documents and more emphasis on summaries, interpretation of research, and curriculum materials. Due to ERIC budgetary restrictions, however, these recommendations were not carried out.

In 1971, Greenwood and Weiler of the RAND Corporation of Santa Monica, California were hired to review the ERIC Clearinghouse structure. With respect to practitioner use, Greenwood and Weiler reached similar conclusions to those of the Dissemination Advisory Committee. They state:

> simply increasing the supply of information will have little benefit unless more attention is paid to evaluation and synthesis; therefore, evaluating and synthesizing the data base should be the minimum system objective .... The most glaring deficiency in the current education literature is the lack of documents translating preferred programs and research findings into operational advice to practitioner

To summarize, Greenwood and Weiler counseled synthesis and service to practitioners as priorities for ERIC.

Changes recommended by Greenwood and Weiler and the Dissemination Advisory committee were never fully implemented in the ERIC system. Efforts were made, however, to collect more practitioner oriented

materials. In October of 1977, Bibliographic Retrieval Services, Inc. (BRS) was given a contract to develop and test out a National Practice File.

This project was intended to assess how an ERIC-like program might provide practitioners with information about educational programs and practices as contrasted with research results. The new file was intended to provide practitioners with information on exemplary practices, model programs, and promising ways of doing things in classrooms and schools. According to BRS, the test file contained approximately two-thousand records of programs and practices from the National Diffusion Network, state ESEA Title IV-C programs, San Mateo Educational Resources Center (SMERC) and numerous other sources (National Education Practice File Development Project, 1980). The file was pilot tested for six months (May-November, 1979) in fourteen organizations, all but two of which already operated information-based dissemination programs.

Despite the fact that the test period included three summer vacation months, the file was used extensively by practitioners. Sixty percent of all practice file users were elementary and secondary school teachers and school-site administrators. (This is in contrast to ERIC which is mainly used by academics and researchers). The three most common purposes for seeking information from the Practice File were program development, curriculum development, and classroom instruction. The Practice File was clearly used by educators for the purpose of improving instruction. BRS recommended the filed be expanded. After some delay, NIE issued an RFP for additional work (Crandell, 1982).

NETWORK case studies indicate that when barriers to use are removed--for teachers who are working together in a project, with ready access, low-cost assistance from a skilled searcher who can help them define the problem and sift available material so that the outcome of the search is a few useful really pertinent documents-- practitioner use of ERIC can be highly useful and satisfying (Crandell et al., 1985). While statistics on practitioner users in general have suggested that teachers and administrators represent between 20 and 30% of total, figures from access points where services are tailored to a practitioner audience are dramatically higher. The SMERC center in California reported 85% use by practitioners and the RISE Center in Philadelphia 69% (MacColl et al., 1985).

Can an information system help improve schools?

A key to sustained school improvement is the ability of the educational system to translate reform momentum and state policy into more effective instruction at the classroom level. Research conducted at Rand, between 1973 and 1977, tracing educational innovation in almost 300 school systems found that it is not the technical innovation per se that makes the difference but what teachers do with it. In the final analysis, schools are not improved by policy makers or researchers, they are rendered effective by classroom teachers.

After studying American high schools extensively Ernest Boyer states, "I started out looking at schools as part of a social and political context. I ended with the intense belief that, while this context cannot be ignored, it must be overshadowed by the teacher and the classroom". Analysis of school change literature reveals teachers

as key actors, heavily involved in what they will be doing in their classrooms, either developing practices themselves, or adapting externally developed practices to meet their individual instructional needs (Crandell et al., 1983). If the information gained from educational research is to have any useful effect on school practices it must be made accessible to classroom teachers.

Teaching is a complex task which if conducted effectively relies on a substantial knowledge base. Effective teachers vary the methods or style of teaching to fit both student characteristics and the subject matter of the lesson (McDonald, 1975a). This involves making complex instructional decisions, on a daily basis, which draw on their subject matter knowledge, understandings about children's learning and development, and knowledge about instructional materials and methods. It involves deciding which teaching methods and material will be effective for diverse groups of students of different ability and developmental levels, and from a variety of cultural backgrounds. In recent years there have been significant advances in our understanding of the teaching learning process but this information is not readily available to teachers.

Much of the instruction presently offered in today's schools does not deal effectively with the diversity of student needs existing in most classrooms. Despite a substantial body of research which demonstrates individual differences in the way students learn, many teachers treat them as if they were all the same. Most instruction follows a "batch processing" model in which students are expected to learn at the same rate, in the same style, using the same materials,

irrespective of individual differences. As a consequence, large numbers of students are expected to attain inappropriate objectives, or to learn from inappropriate methods. Goodlad's Study of Schooling, based on detailed observations of 1,016 elementary and secondary school classrooms, found a restricted and "flat" curriculum with a meager array of learning materials (mostly textbooks and worksheets) and activities (mostly listening to the teacher and writing answers to questions).

Boyer, Goodlad, and Sizer all agree that a teacher must spend as much time analyzing, planning, and preparing for lessons as is spent in direct instruction. They need to organize and employ a rich array of individualized instructional materials. If teachers are to teach a diverse student population effectively they need a substantial and readily accessible storehouse of information on instructional methods and curriculum materials from which to draw.

Teachers' needs for continuing sources of information on educational practice are made more urgent by the brevity of their professional training. Unlike physicians, attorneys, and accountants, who spend five plus years assimilating the specialized knowledge base of their profession, teachers receive minimal training. Kerr (1983) found nationally that preparation for teaching at the elementary school level requires only six or seven methods courses which cover reading, social studies, math, science, art, and music. Preparation for secondary school teaching covers some sort of introduction to education, either educational psychology or sometimes adolescent psychology, a general methods course, and a subject-specific methods course in the trainee's speciality.

Kerr also found that while other professions had extended their period of training over the last fifty years to accommodate an expanded knowledge base, the proportion of teacher preparation devoted to professional studies had actually decreased. In such a short period of professional preparation, teachers can only skim the surface of knowledge about instruction. A system must be developed that allows teachers continuously to increase and update their knowledge about teaching as they teach.

PRINCE: Professional Resources Information Network Computerized for Educators

The information needs of practitioners are quite different to those of academics and researchers. Practicing educators are not interested in framing questions or generating hypotheses. They want concrete answers that respond to the needs of the specific instructional contexts in which they are working. They need a ready supply of action oriented information buttressed by instructional materials. In their current form, the vast resources of the ERIC system are virtually useless to practitioners. ERIC is valuable to researchers and academics, it functions well, it is cost effective, and it should be retained. There is, however, a need to develop an information system specifically geared to the needs of practitioners.

Because the development of ERIC has been so dominated by researchers' needs, a practitioner system should be developed, separate from, but complimentary to ERIC. The question, "Can research improve practice?" cannot easily be answered unless a vehicle is provided to deliver the information in a usable form to practitioners.

The U.S. Department of Education should fund and develop PRINCE: Professional Resources Information Network Computerized for Educators. PRINCE would be tailored to meet the specific needs of classroom teachers. Modeled after MEDLINE, a diagnostic medical information system developed by Lockheed for physicians, PRINCE would deliver instruction-related information via microcomputers directly to teachers at schools.

The main task in the development of PRINCE would be establishing the information base and structuring and storing it in a form so it can be easily used by practitioners. This task is unlikely to be undertaken by the private sector. Development costs are probably too high to attract private investment. We see the public sector's role as developing the information system. Private industry could subsequently deliver the service to clients, as it already does with ERIC on the DIALOG system. The U.S. Department of Education should establish a Central PRINCE Facility charged with formation of a practitioner-oriented information system.

PRINCE would have three levels of information:

1) Proven Practice: Information contained in this file would describe research and innovative programs where there has been a demonstrated improvement in student achievement. Preferably these results will have been observed on more than one occasion. The file will contain specific details on how teachers can use these practices in their own clasrooms. Information contained in this file will be rigorously selected.

Promising Practice: Information contained in this file would describe promising new approaches and trends. It will focus on reviews and syntheses of research and descriptions of promising new programs and innovative curriculum materials.

Information exchange: would be based on teachers own experience and ideas. An electronic bulletin board would be utilized to enable teachers to exchange instructional ideas with each other.

The following four criteria should underly all PRINCE functions.

1) PRINCE should be diagnostic

The information should be stored in a form that is consistent with the manner in which teachers will use it. Teachers require information for use in specific instructional contexts. For example, a teacher may require information on effective methods and materials for teaching reading to 6 year old bilingual students whose native language is Cantonese. Or how to develop a 5th grade biology curriculum for a group with a wide range of reading ability (what texts are available that cover the same content at different levels of reading difficulty). This means the system should be diagnostic, a teacher must be able to use it to call up information about teaching specific subject matter content to specific groups of students. Information should be classified by 1) subject matter (algebra- differential equations, reading -- b/d confusion, reversals etc.): 2) age level of student (early childhood, elementary, junior high, high school levels at least); 3) specific types of instructional problem (poor reading ability, mixed ability grouping)

2) PRINCE should provide information that can be used in instruction

Teachers need concrete information --- curriculum guides, lesson plans, descriptions of activities, work sheets, lists of books and materials and where they can be obtained --- that can be used almost immediately. The information needs to be succinctly and clearly presented. Information stored in PRINCE should follow a standard format which includes; 1) content of instruction, 2) description of students to whom it was taught, 3) results obtained, 4) description of teaching methods and student activities, 5) description of materials, how much they cost, and where they can be obtained. Where possible, materials should be accessible on-line to be printed at the school site. Documents should be short, averaging 3-5 pages.

In the beginning period, much time will be spent sorting through and synthesizing information already contained in ERIC. New information sent to PRINCE, however, should be required to be submitted in a standard format. A separate commercial file can be established in PRINCE where text book publishers, curriculum material developers etc. can pay to have their materials presented. Once again the material should be packaged in a standard format.

3) PRINCE should be available at the school site

ERIC was designed for the technology of the 1960's. A series of adjustments have been made to keep it current, but the fundamental structure has remained the same. The location-bound technology utilized during much of this period, the mainframe computer and microfiche, played a role in limiting ERIC's use by audiences other than the

research community. It has been many years since the federal sector made any funds available for the ERIC system even modestly to explore emerging technologies. What development has been done has been supported by the private sector. The time is ripe to invest resources in assessing current and future technology which would provide easy access to practitioners.

Modern on-line databases, such as the Lockheed DIALOG system, would allow the PRINCE system to be used at the school site or at home. On-line retrieval allows the full text of a document to be printed at the school site. This technology in effect would put the entire PRINCE database on a teacher's desk top, easily accessible without a mainframe computer. With this system a teacher could access PRINCE, request information on teaching a lesson on the Bill of Rights to fifth graders, and print a list of curriculum materials, work sheets, lesson plans, all within an hour without leaving the school.

3) PRINCE should be user-friendly.

Evaluation of practitioner use of ERIC demonstrates that practicing educators welcome the assistance of intermediaries in the search process. To facilitate PRINCE use, mentor or specialist teachers should be trained by Central PRINCE to assist local teachers with on-line searching via microcomputers at the school site, and to train teachers to do their own on-line searching. An 800 phone number should be provided for teachers to call for search assistance. Contracts should be developed with computer companies, such as IBM and Apple, so that schools and individual teachers can purchase microcomputers at reduced rates.

4) PRINCE should facilitate exchange of ideas between practicing educators

Teachers are more likely to use materials and methods recommended by other teachers, but the nature of teaching means that they are often professionally isolated and have little opportunity to share ideas. Electronic mail, electronic conferencing, and electronic bulletin boards are commonplace these days. This is a natural technology for practitioners to use to share information about teaching. A national electronic bulletin board could be used by teachers to post (and obtain) ideas for lessons about current events. For example, the nuclear accident at Chernobyl probably was discussed 100,000 times within 72 hours of the accident, by students and teachers in American schools. Many of these teachers knew little of the scientific, health, and social implications about which their pupils were asking questions. By using an electronic bulletin board an English teacher may be able to move quickly into a unit on Ibsen's Enemy of the People; a science teacher into a unit on the consequences of radiation on bone marrow or on upper air patterns and meteorology; or a social studies teacher into discussion of government policies in disaster management and information dissemination.

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This paper proposes the formation of a Professional Resources Information Network Computerized for Educators (PRINCE) intended to parallel the existing information network available to researchers,

ERIC. Clearly improvements can be made to ERIC, e.g., upgrading its technology. However, far greater returns to the investment of federal funds could be obtained by promoting the establishment of a new system which can provide research related information to practicing educators.

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